REMARKS

This communication is in response to the Non-final Office Action mailed 18 October 2007. Prior to entry of this amendment, claims 1-33 are pending. Applicants would like to thank Examiner for withdrawing the restriction requirement. Amendments have been made to claims 1, 8, 11, 13, 14, 18 and 20. No new matter is added with these amendments. Support for these amendments can be found in the previous claims and page 12 of the specification. Support for the amendments to claim 8 is found in paragraph 62, page 17 of the specification. Amendments to claims 11 and 13 are to correct typographical errors. Amendments in claim 20 are supported by Example 1, page 24-25 of the specification. New claims 34-36 have been added and find support in the originally filed claims. New claims 34-36 have been added and find support in the originally filed claims.

For the sake of clarity, the rejections of the presently outstanding Office Action are addressed below in the order in which they were presented.

Response to Claim Rejections – 35 USC § 112

Claims 18 and 19 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention because in claim 18, "said culturing layer" lacked antecedent basis. Claim 18 has been amended to depend from claim 17 rather than from claim 14 to correct the lack of antecedent basis. Accordingly, Applicants respectfully request the removal of the rejection under 35 USC § 112 for claims 18 and 19.

Response to Claim Rejections – 35 USC § 103

Claim 1 was rejected under 35 USC § 103 as being unpatentable over Kovacs et al. (5,981,268) in view of any of Brown et al. (LDRD Annual Report), Luo et al. (Bio-Medical Materials and Engineering), or Franks (4,968,623). Examiner argues that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the

detector array of the primary reference with a thin film of diamond-like carbon material to improve cell adhesion to the surface of the detector array."

Applicants assert that the use of the article, Brown et al. for rejection under 35 U.S.C. § 103(a) is improper. Enclosed herewith on page 11 are specific declarations by the inventors establishing that the article, Ian G. Brown et al., "Large Patterned Networks of Living Neurons," LDRD 2001 Annual Report, Accelerator and Fusion Research Division (March 25, 2002), describes their own work as described in this application, and that the co-authors of the cited reference are not named as authors of the cited reference because the LDRD report listed only the two principal LBNL investigators. Furthermore, the cited reference was included as part of the provisional 60/457,760, filed on March 25, 2003, to which this application claims priority. Therefore, Brown et al. is not a proper reference that can be used as prior art against Applicants claims under 35 USC § 103.

Applicants disagree that the two cited references, Luo et al. or Franks et al., disclose patterning the thin-film of diamond-like carbon (DLC) material. While both references teach the use of DLC as a biologically compatible material suitable for use in cell culture, neither Luo et al. or Franks et al., nor any other cited reference, teach that application of DLC could be used to direct or pattern cell growth in a manner as Applicants have claimed. This feature is discussed specifically on page 12 of Applicants' specification and shown below.

> "The patterning of film 30 is designed to control the connections between neuronal cells in predetermined ways. The material used in patterned film 30 is designed to facilitate neuronal attachment and growth, so that the areas of the device lacking patterned film 30 have essentially no neuronal growth. Accordingly, a neuronal body may be selected for engagement by a dendrite at a pre-determined distance from the center of the neuron by virtue of the arrangement of patterned film 30. The patterned film 30 may also be formed of an electrically conductive metal to be useful for delivering an electrical signal to a pre-selected neuron."

Applicants also point to Figure 6, which shows patterned growth of neurons on DLC while there is little to no growth on areas with no DLC.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA

1974). Applicants respectfully submit that Kovacs et al. does not teach or suggest a cell culture apparatus having a thin patterned film that patterns cell growth, as claimed by Applicants. As such, the Examiner has failed to establish a *prima facie* case of obviousness with regard to claim 1, because the combination of Kovacs et al. in view of Franks et al. or Luo et al. does not teach each and every feature of Applicants' claimed invention.

Furthermore, there is no teaching, suggestion or motivation to combine these two references with Kovacs et al. to make Applicants' claimed invention. Franks et al. and Luo et al. show examples of using DLC in common cell culture containers such as, vials and microtiter plates as shown in Figure 1 and 2 respectively in Franks et al. In Kovacs et al. the cells are grown either directly on the microelectrode array or in Petri dishes placed on the microelectrodes. Since according to Kovacs et al. the cells were allowed to adhere to the microelectrodes (col. 15, line 53), there would have been no motivation to use another patterned layer or film to pattern cell growth since it was not known that diamond-like carbon patterned cell growth as described in the present specification.

Thus, Applicants assert that it was not obvious to use a patterned film of diamond-like carbon to pattern cell growth on a detector array. Therefore, Applicants respectfully request that the rejection be withdrawn. In light of the foregoing arguments, Applicants respectfully request that the rejection of claim 1 under 35 U.S.C. § 103 be withdrawn and the claim allowed.

Response to Claim Rejections – 35 USC § 103

Claims 2-33 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kovacs et al (US 5,981,268) in view of any of Brown et al (LDRD Annual Report); Luo et al (Bio-Medical Materials and Engineering) or Franks (US 4,968,623) taken further in view of Miyamoto (US 5,702,915).

For the reasons as stated above, Applicants reiterate that the use of Brown et al. for rejection of claims 2-33 under 35 U.S.C. § 103(a) is improper. Because it is improper, Applicants do not include it in the analysis below.

Applicants disagree with the Examiner's reading of Miyamoto as disclosing "that it is known in the cell culture art to interface a cell culture with a CCD array (1)..." Office Action at 5. Indeed, Miyamoto states that "[a]fter charge coupled device (CCD) have been made available, the element for taking photographs of images of a solid has developed and has been enormously improved...Because of these advantage[s], the element for taking photographs of images of a solid is taking over camera tubes in the field of broadcasting and so on." Miyamoto clearly is referring to using a CCD to take photographs of a solid and cell activity (col. 1, line 54) and not referring to any known technique of "interfac[ing]" cells with a CCD array.

Neither does Miyamoto teach or suggest interfacing cells with a CCD array as claimed by Applicants. Miyamoto teaches the use of a cell culture container positioned on the upper surface of a solid-state area image pickup element, but does not teach or suggest the use of a thin protective film over the CCD and/or a thin patterned film to pattern cellular growth. Again, for the reasons given above, the cited references of Kovacs et al, Luo et al, and Franks et al. do not teach, suggest or motivate the combination of these elements to make Applicants' claimed invention. Applicants use a thin protective film of micron layer thickness as opposed to the cell culture containers taught by these four cited references which feature centimeter thickness. Heretofore, it was not contemplated that thin films could be used and that cells would remain viable for long-term growth (upwards of days and weeks at a time).

Thus, Applicants assert that it was not obvious to combine these references to use a thin protective film directly over the CCD or to use a thin patterned film such as diamond-like carbon to pattern cell growth on a detector array. Therefore, Applicants respectfully request that the rejection be withdrawn. In light of the foregoing arguments, Applicants respectfully request that the rejection of claims 2-33 under 35 U.S.C. § 103 be withdrawn and the claims allowed.

CONCLUSION

Accordingly, Applicants respectfully request the entry of the claims as amended and provided herein. A petition for an extension of time to the fifth month is included. A fee of $230.00 is believed due for the extension of time. Applicants also added 3 new claims, a fee of $25.00 per claim is believed due. The Commissioner is hereby authorized to deduct a total of $315.00 from Deposit Account 120690. Applicants believe all fees necessary for this amendment are submitted herewith. If any additional fee is necessary for entry of this amendment, then Office is hereby authorized to deduct that charge from Deposit Account 120690.

Should the Examiner believe that a telephone interview would aid in the prosecution of this application, Applicants encourage the Examiner to call the undersigned at (510)495-2456.

Respectfully submitted,

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